about the product, 27 % were made to think about the brand and 14 % started thinking about purchasing the product) [4].

As to the cost of an advertisement placement, only in Kharkiv it accounts for 18,000 hrn for half a year. [5].

An advertisement placement in metro trains is carried out simultaneously in all 315 subway cars. The scheme provides the possibility to cover the whole city. In spite of the fact that one package costs more than 10,000 hrn, with respect to the number of passengers who see it, it is considered to be one of the cheapest forms of advertising.

Therefore, transport advertising is one of the few types of advertising which possesses the properties of mass communication and is one of the most effective advertising means with respect to cost and efficiency. It is affordable to advertisers with different budgets – from well-known brands to local small companies. It is definitely a product with a very high degree of influence on potential customers.

References

1. Уеллс У., Моріарті С., Бернетт Дж. Реклама: Принципы и практика / пер. с анг. – СПб.: П., 2008. – 736 с.
2. Братко О. С. Маркетингова політика комунікацій: Навч. посіб. – Тернопіль: Карт-бланш, 2006. – 275 с.
3. Лук'янець Т. І. Маркетингова політика комунікацій: навч. посіб. – Київ : КНЕУ, 2000. – 380 с.
4. http://www.sostav.ru/blogs/27659/4080
6. 5.http://www.profitrise.com.ua/naruzhnaya-reklama/reklama-na transporte/
7. https://freeboard.kharkov.ua/reklama_v_metro.html

EFFECT OF THERMAL MASS ON BUILDING ENERGY PERFORMANCE

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Buildings consume more than 30% of the primary energy worldwide. In many of these buildings, the energy consumption can be significantly reduced by adopting energy efficiency strategies. One of the modern sustainable and energy-efficient strategies is active use of thermal mass in building design.

Thermal mass is a term in building design that means the ability of a material to absorb and store heat energy. In the buildings with high thermal mass the indoor temperature change is slow. As a result, in summer time maximum inside temperature is reached only during the late hours when the outside air temperature is already low. The heat that flows from the heavy walls inside can be removed with good ventilation in the evening and night. The capability to store energy also helps in winter, since energy can be stored in walls from one sunny winter day to the next cloudy one. Thus, appropriate use of thermal mass in a

building can reduce peak heating or cooling load, and subsequently building energy consumption and carbon footprint.

A bulk of research was dedicated to the relationship between thermal mass and energy performance of building envelope. The influence of various thermal insulation [1, 2] and phase change material [3], air tightness and infiltration of building envelope [4] play a crucial role in the energy consumption of a building.

Energy-saving effect thermal mass can be intensified by coupling with natural and night ventilation [5]. However, in a hot humid climate it is not recommended to use thermal mass with night ventilation as a passive cooling

The effect of thermal mass on love cycle cost and CO_2 emissions is highly dependent on climate conditions of the construction. In average, the lowest lifecycle CO_2 were found for the heaviest weight of building construction [6].

Existing studies of thermal mass were mostly based on the laboratory monitoring, field experiments and theoretical simplified models. The multifactorial optimisation calculations as a part of a holistic energy efficient building design approach can reduce the size of mechanical systems compensating the additional cost of energy efficiency features.

Thus, building energy modelling and optimization are getting more relevant nowadays, since energy efficiency approaches sometimes might not require additional capital investment. Application of thermal mass as an energy saving method is more effective in places where the outside ambient air temperature differences between the days and nights.

References

1. Sadineni S. B, Madala S, Boehm R. F. Passive building energy savings: A review of building envelope components // Renewable and Sustainable Energy Reviews. – 2011. – Vol 15, №8. – P. 3617–3631.

2. Balaras C. A. The role of thermal mass on the cooling load of buildings. An overview of computational methods // Energy and Buildings. – 1996. – Vol. 24, №1. – P. 1–10.

3. Ogoli D. M. Predicting indoor temperatures in closed buildings with high thermal mass // Energy and Buildings. – 2003. – Vol. 35, №9. – P. 851–862.

4. Al-Sanea S. A, Zedan M. F, Al-Hussain S. N. Effect of thermal mass on performance of insulated building walls and the concept of energy savings potential // Applied Energy. – 2012. – Vol. №1. – P. 430–442

5. Yang L., Li Y. Cooling load reduction by using thermal mass and night ventilation // Energy and buildings. – 2008. – Vol. 40, № 11. – P. 2052–2058.

6. Hacker J. N, De Saulles T. P, Minson A. J, Holmes M. J. Embodied and operational carbon dioxide emissions from housing: A case study on the effects of thermal mass and climate change // Energy and Buildings. – 2008. – Vol. 40, №9. – P. 375–384.